THE AMERICAN

GAS LIGHT JOURNAL

INC.

PUBLISHED WEEKLY, AT 42 PINE ST.

VOLUME CIII. No. 25.
Whole No. 3,015

NEW YORK, MONDAY, DECEMBER 20, 1915.

Subscription, $3 Per Year.
$4 Canada, $5 Foreign.

LIBRARY OF CONGRESS,
DEC21 1915
SMITHSONIAN DEPOSIT.

Riter-Conley Manufacturing Company

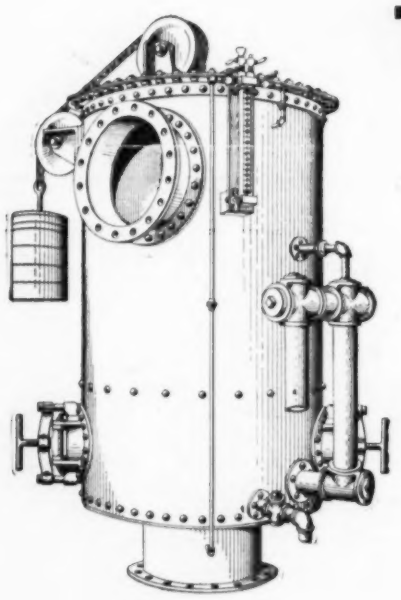
STEEL CONSTRUCTION

Pittsburgh

INDEX TO CONTENTS, PAGE 400.

ADVERTISERS' INDEX, PAGE 24.

A TAR EXTRACTOR THAT EXTRACTS



98.4% EFFICIENT IN ACTUAL PRACTICE WITH

WATER GAS

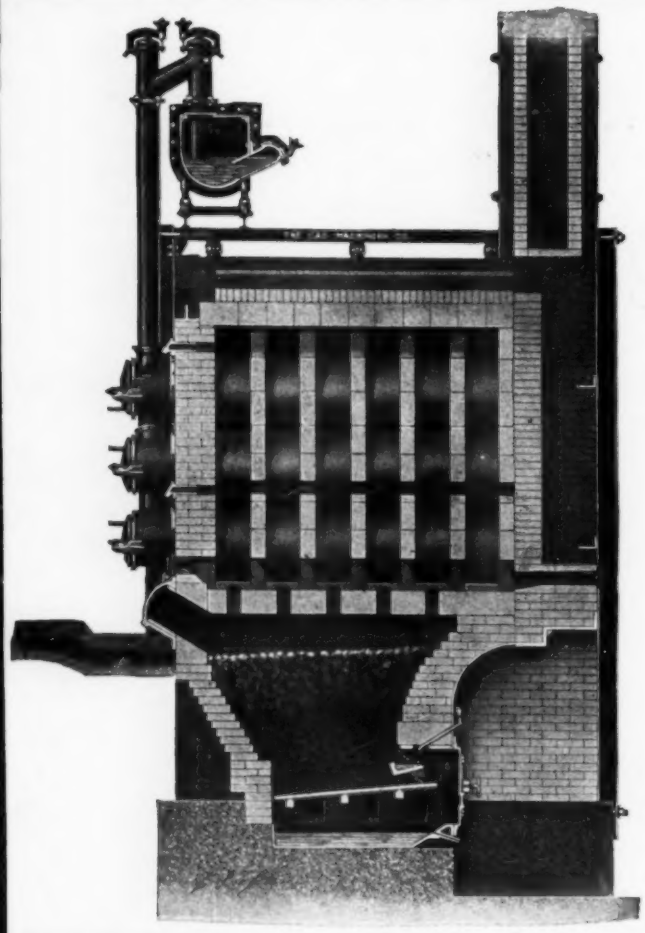
IF INTERESTED, WRITE TO

THE UNITED GAS IMPROVEMENT CO.

PHILADELPHIA

BUILDERS AND OPERATORS OF

STANDARD DOUBLE SUPERHEATER LOWE WATER GAS APPARATUS



"GASMACO" COAL-GAS BENCHES

WITH SILICA RETORTS AND SETTINGS, AND INCLINED TUBE RECUPERATORS.

HALF DEPTH, REAR CLINKERING SIXES.

SECTIONAL SILICA RETORTS.

The Gas Machinery Company,

CLEVELAND, OHIO.

THE AMERICAN
GAS LIGHT JOURNAL
INC.

VOL. CIII., No. 25. NEW YORK, DECEMBER 20, 1915. WHOLE No. 2,135.

GAS LIGHT IN PHOTOGRAPHY.

Describing an All-Gas Studio—Every Operation by Artificial Light.

By Robert ff. Pierce.

Although the amount of revenue obtained, and obtainable, from photographers is not in most cases sufficient to justify any extensive and elaborate business getting campaign on the score of profits on gas sold for this service, there are few gas companies without some good "prospects" that may be closed by a small expenditure of time and trouble by the general salesmen. While much of the required apparatus is special, it may be constructed under simple instruction by any pipe-fitter and tinsmith, and the gas company need not concern itself with these items beyond furnishing the information to the customer.

Gas light properly used is highly satisfactory in a number of applications about the photographic studio. In fact, it requires only a little ingenuity to make it available, satisfactory and economical for nearly every purpose served by any illuminant.

In its relation to photography, artificial light differs from daylight in two particulars:

1. In the spectral distribution of energy. Most of the commercially desirable sources of artificial light are very deficient in radiation in the short wave lengths—while possessing excessive radiation in the orange and red portions of the spectrum. Since the photographic plates employed are highly sensitive to the orange and red, it is apparent that artificial illumination must be greatly in excess of daylight illumination, for equal photographic effect. Fig. 1 shows the spectral energy distribution of several commercial light sources compared to daylight.

2. Artificial light sources are of small dimensions, and as far as photographic effects are concerned, all may be regarded as "point" sources, in contradistinction to the single large skylight, which is the photographer's source of daylight. Thus, illumination from any *single* artificial light source will be characterized by more pronounced contrasts of light and shade than are produced by the usual natural illumination. The reflection of the light source which appears in the eye will also disclose the nature of the source. This reflection is easily removed by the retoucher, however.

Any light source producing radiation to which the photographic plate is sensitive, may be made to duplicate natural illumination for photographic purposes.

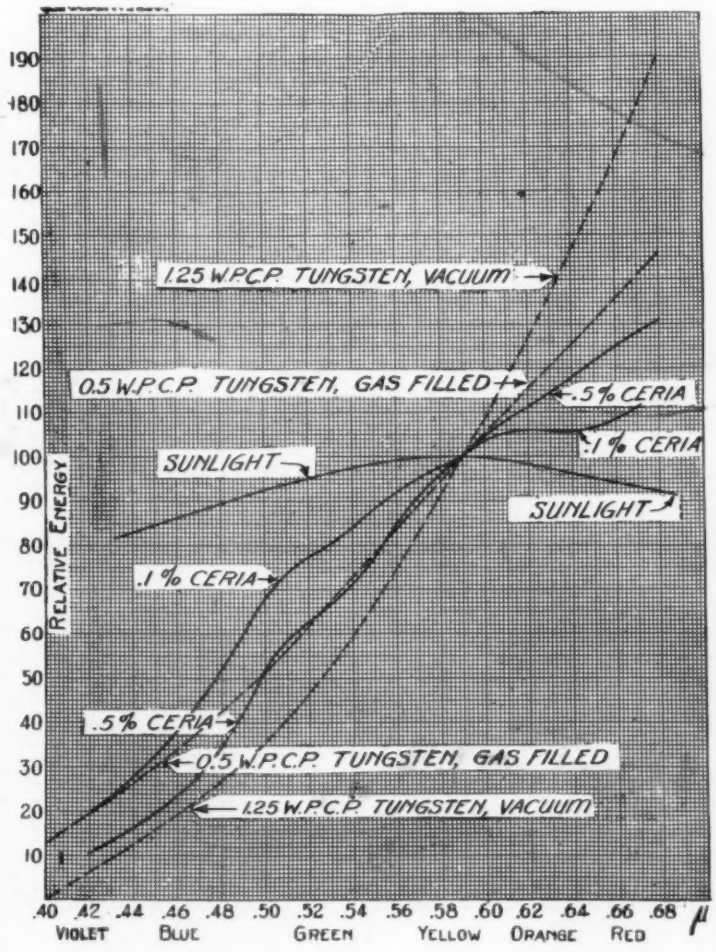


Fig. 1.

If radiation in the short wave lengths be deficient, it is only necessary to increase the intensity of illumination accordingly; and excessive radiation in the yellow to red may be filtered out if the heat produced by energy radiated in this part of the spectrum is found objectionable.

The characteristics of natural lighting, in so far as the distribution of illumination is concerned, may be duplicated by distributing several light sources over a large area, and the reflections of the light source in the eye may be eliminated (if necessary) by placing a translucent diffusing screen between the light sources and the subject. The whole problem then is the development of a light source in which the efficiency of radiation in the shorter waves is high enough to make its use commercially practicable.

In electric incandescent lamps, the proportion of radiation in the shorter waves, and at the same time the efficiency of light production, may be increased by simply increasing the temperature—by "over-running" the lamp. In incandescent gas lamps no such expedient is at present practicable. Mantle temperatures are rather closely limited by the prevailing gas presures, but the selective radiation characteristics of the mantle materials offer a practicable solution of the problem.

The ordinary commercial mantle contains about 0.75% ceria and 99.25% thoria. Increasing the percentage of ceria increases the proportion of radiation in the longer waves, and decreasing the ceria increases the proportion of radiation in the shorter waves. This is shown quite clearly in Fig. 1. Unfortunately, the efficiency of light production decreases as the per cent of ceria is di-

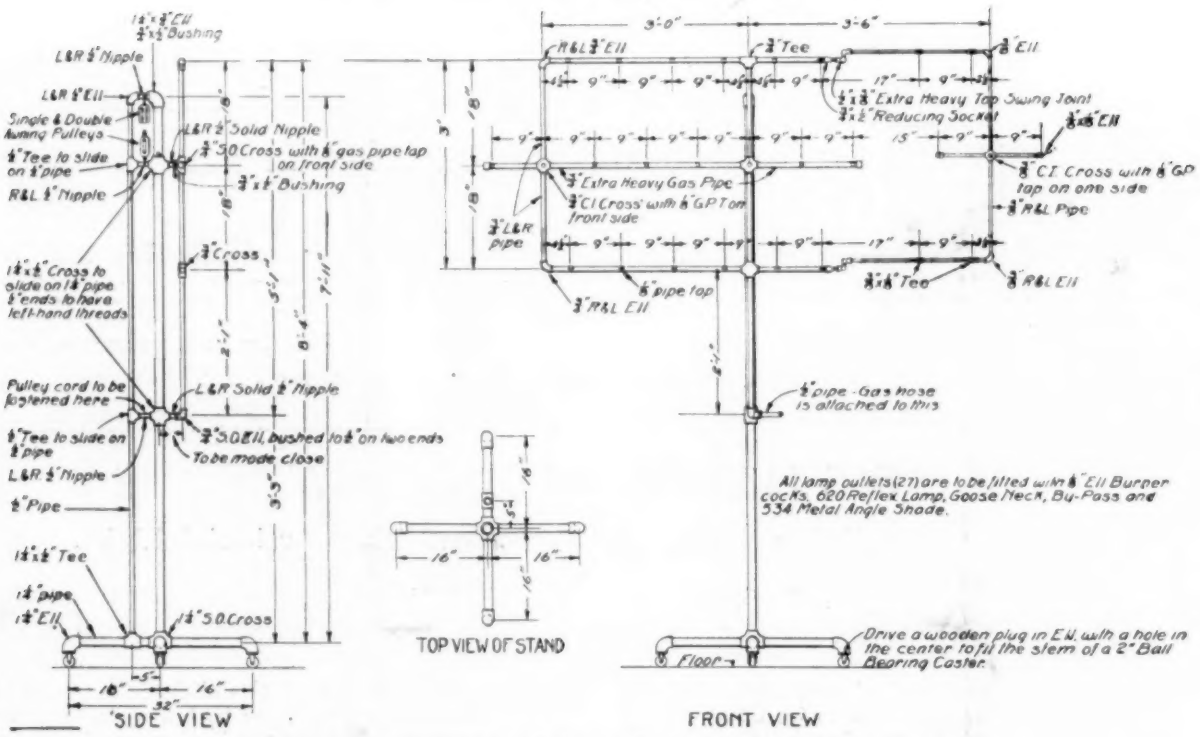

SIDE VIEW
TOP VIEW OF STAND
FRONT VIEW
Single & Double Awning Pulleys
Pulley cord to be fastened here
All lamp outlets(27) are to be fitted with ⅜" Ell Burner cocks, 620 Reflex Lamp, Goose Neck, By-Pass and 534 Metal Angle Shade.
Drive a wooden plug in Ell. with a hole in the center to fit the stem of a 2" Ball Bearing Caster.
Floor

Fig. 2.

MATERIAL REQUIRED FOR REGULAR STUDIO-LIGHTING APPARATUS.

Lamp Equipment,

27—No 620 Reflex Lights, with No. 406 Photolite Mantles, and No. 534 Enameled Steel Angle Reflectors.

Pipe and Fittings.

13 Ft.—$1\frac{1}{4}$-inch Pipe.
8 Ft.—$\frac{1}{2}$-inch Pipe.
4—$1\frac{1}{4}$-inch Ells.
1—$1\frac{1}{4}$-inch Outlet Cross.
4—$\frac{3}{4}$-inch x $\frac{1}{2}$-inch Bushings.
1—$\frac{3}{4}$-inch Side Outlet Ell.
1—$\frac{3}{4}$-inch Side Outlet Cross with $\frac{1}{8}$-inch G. P. Top on other side.
2—$\frac{3}{4}$-inch Crosses (one to be tapped for $\frac{1}{8}$-inch G. P. on side.)
1—$\frac{3}{4}$-inch Tee.
2—$\frac{3}{4}$-inch Caps.
2—$\frac{1}{2}$-inch Close Nipples.
1—$\frac{3}{8}$ inch Left and Right Ell.
21 Ft.—$\frac{3}{4}$-inch Extra Heavy Pipe.
9 Ft.—$\frac{3}{8}$-inch Pipe.
1—$1\frac{1}{4}$-inch x $\frac{1}{2}$-inch Tee.
1—$1\frac{1}{4}$-inch x $\frac{3}{4}$-inch Ell.
1—$\frac{1}{2}$-inch Left and Right Ell.
2—$\frac{3}{4}$-inch Left and Right Ells.
2—$\frac{3}{4}$-inch x $\frac{1}{2}$-inch Reducing Sockets.
4—$\frac{3}{8}$-inch x $\frac{1}{8}$-inch Tees.
1—$\frac{3}{8}$-inch Ell.
2—$\frac{3}{8}$-inch x $\frac{1}{8}$-inch Ells.
1—$\frac{3}{8}$-inch C. I. Cross with $\frac{1}{8}$-inch G. P. Tap on one side.
2—$1\frac{1}{4}$-inch x $\frac{1}{2}$-inch Cross to slide on $1\frac{1}{4}$-inch pipe, the $\frac{1}{2}$-inch ends to have left-hand threads.
2—$\frac{1}{2}$-inch Tees, the throughway to slide on $\frac{1}{2}$-inch pipe.
27—$\frac{1}{8}$-inch Cross Ell Burner Cocks.
27—$\frac{1}{8}$-inch Close Nipples.
2—$\frac{1}{2}$-inch x $\frac{3}{8}$-inch Extra Heavy Top Swing Joints.
4—Wooden Plugs to fit into $1\frac{1}{4}$-inch Ells with holes drilled in center to fit the Caster Stem.
4—2-inch Ball Bearing Stem Casters.
4—Solid $\frac{1}{2}$-inch Nipples (left and right) not over 3 inches long.
1—Length of $\frac{1}{2}$-inch Gas Hose with suitable Shut-Off Cock for same.
1—Set of Single and Double Awning Pulleys.
15 feet of Rope for same.

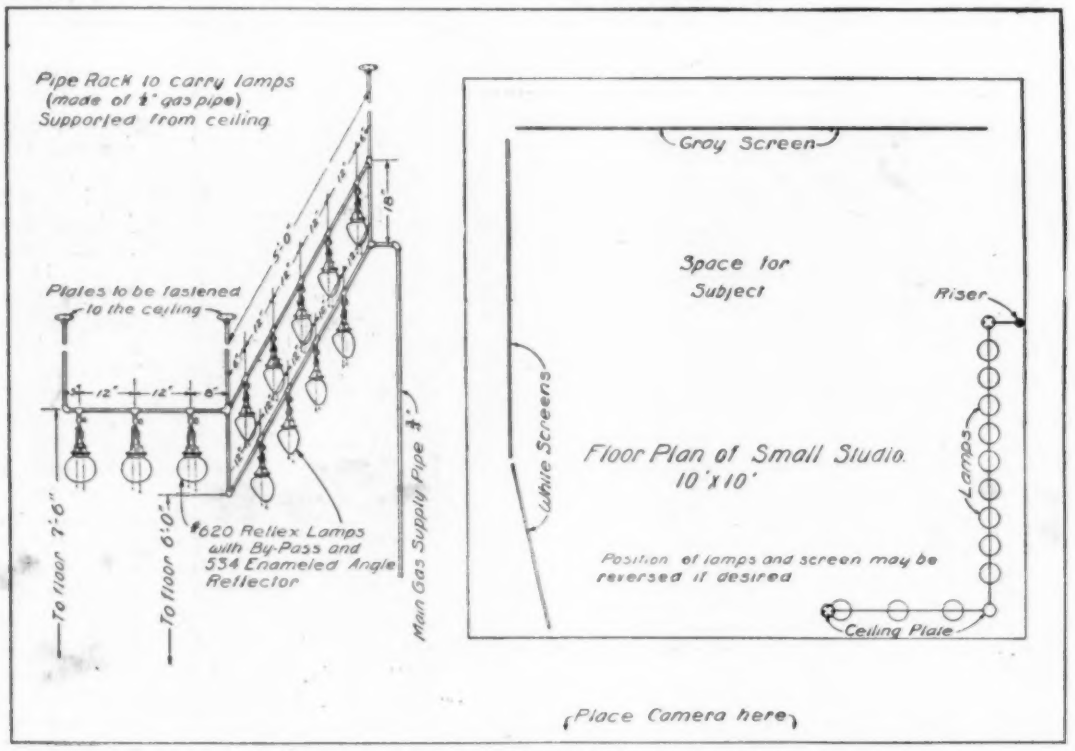

Pipe Rack to carry lamps (made of ¾" gas pipe) Supported from ceiling
Plates to be fastened to the ceiling
620 Reflex Lamps with By-Pass and 534 Enameled Angle Reflector
To floor 7'-6"
To floor 6'-0"
Main Gas Supply Pipe ¾"
Gray Screen
Space for Subject
Riser
White Screens
Floor Plan of Small Studio 10'x10'
Lamps
Position of lamps and screen may be reversed if desired
Ceiling Plate
Place Camera here

Fig. 3.

MATERIAL FOR SMALL STUDIO-LIGHTING APPARATUS.

Lamp Equipment.

12—No. 620 Reflex Lights with No. 406 Photolite Mantles and Enameled Steel Angle Reflectors.

Pipe and Fittings.

16 Feet $\frac{1}{2}$-inch Pipe. (This does not include the drops from the ceiling, as their length depends on the height of the ceiling.
6 Feet $\frac{3}{4}$-inch Pipe. (Additional length must be added to run to gas supply.)
1—$\frac{3}{4}$-inch Ell.
12—$\frac{1}{2}$-inch x $\frac{3}{8}$-inch Tees.
1—$\frac{1}{2}$-inch Left and Right Ell.
1—$\frac{3}{4}$-inch Side Outlet Ell.
1—$\frac{1}{2}$-inch Tee.
1—$\frac{1}{2}$-inch Side Outlet Tee.
2—$\frac{3}{4}$-inch x $\frac{1}{2}$-inch Bushings.
1—$\frac{1}{2}$-inch Ell.
3—Solid $\frac{1}{2}$-inch Flanged Plates.

Fig. 4.

minished below 0.75%, but at 0.25% ceria, it is still high enough to permit use of the mantle in practical commercial service.

This mantle has been used with satisfactory results in the illumination of studios, and in printing and enlarging. For studio lighting, 27 lamps, each consuming about 4 cubic feet of gas per hour, are fitted on the outlets shown in Fig. 2, and equipped with angle reflectors that direct the greater part of the light outward and downward. For small "post card" studios the arrangement in Fig. 3 has been found satisfactory.

Figs. 4 to 9 show the result of exposure of 1/5 second under the apparatus shown in Fig. 1.

Complete photographic data follows:

Fig. 5.

Fig. 6.

Lens	19.5" B. & L.
Stop	F. 4.5
Plate	8 x 10 Orthonon
Developer	Pyro
Paper	Azo H.
Time of Printing	3 to 5 seconds

These illustrations are given to show the results that may be obtained with very simple apparatus. The photographs were not taken by a photographer who makes a specialty of portraits, and only one screen and background were used. With the more complete equipment used by photographers who specialize on portrait

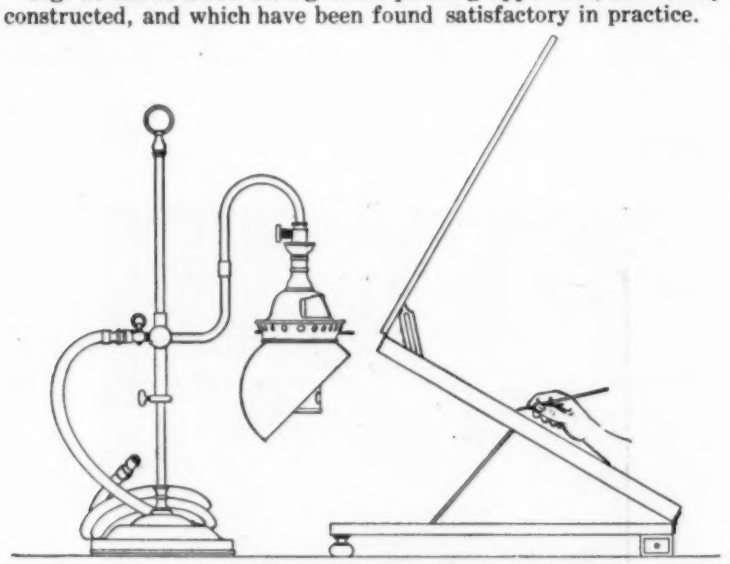
Fig. 7.

Fig. 8.

Fig. 9.

work, a greater variety of effects may be obtained. Several photographers, who have used this apparatus state, that it is as satisfactory as daylight in every way, and much superior, in that the intensity of illumination is constant, permitting a more accurate timing of exposures.

Fig. 10 shows a retouching and a printing apparatus, both easily constructed, and which have been found satisfactory in practice.



Retouching Apparatus.

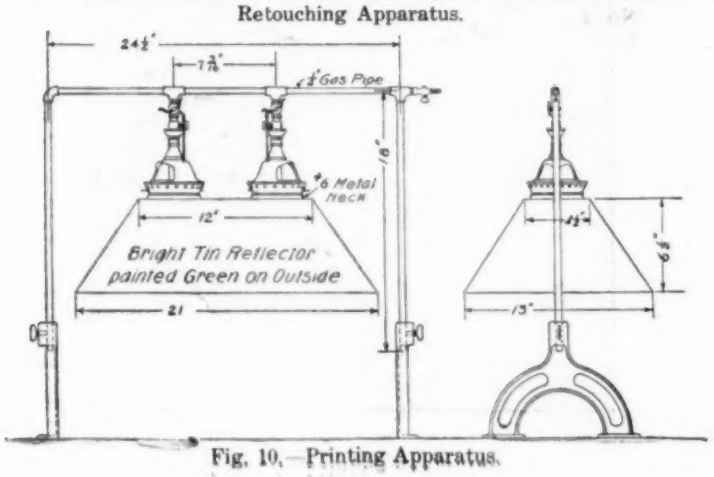


Fig. 10.—Printing Apparatus.

Fig. 11 shows an enlarging apparatus, the construction of which any photographer will understand.

Equipped with no more information than is furnished herewith, any salesman is in a position to recommend a satisfactory gas lighting appliance for almost any requirement of the small portrait or commercial photographer, and give complete practical information for its construction by the customer. He can also present, in the form of Fig. 1, all the technical evidence of the suitability of gas light as compared to other illuminants, that the more scientifically inclined are likely to demand.

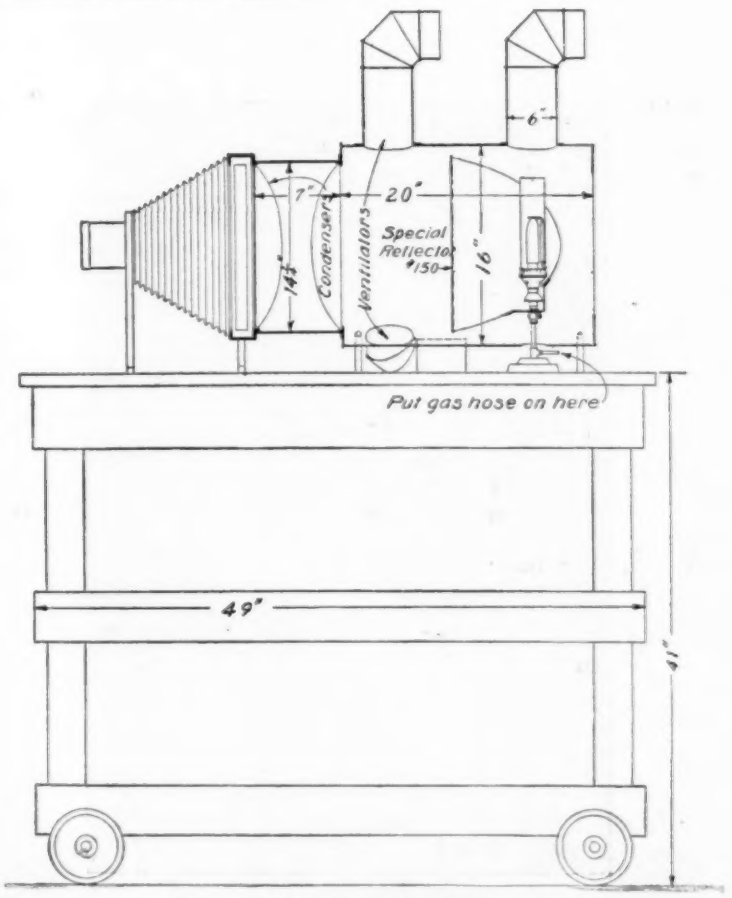


Fig. 11.—Photo-Enlarging Apparatus.

TAR DEHYDRATION.

From paper by E. V. CHAMBERS, to the Manchester District Institution of Gas Engineers.

The tar produced at gas works in earlier times was looked upon as a waste product, its use limited to the manufacture of roofing felt, and as a cheap paint. Some attempts were made to burn tar under retorts; but, for various reasons, this practice did not become general. Inquiring minds continued to grapple with the potentialities of gas tar; and it was found that by a partial distillation the tar could be broken up into crude naphtha, creosote oil, and pitch. The crude naphtha was used as an illuminant, and the creosote as a preservative for timber.

Mansfield, in a patent specification. described the composition of the distillates from coal tar, together with a description of the process for manufacturing pure benzene on a large scale. Following the production of benzene came aniline oil; and in 1856 Perkin made his great discovery, the production of a beautiful mauve color. In the meantime other products had been identified and separated from coal tar—naphthalene, carbolic and cresylic acids, and anthracene. The latter became of some importance, and of enhanced value, because of the discovery of artificial alizarin, from which it is manufactured. Contemporaneously with these discoveries, coal tar distillation was more extensively practiced, and more attention paid to the fractional separation and rectification of the products.

In recent years crude tar has been sprayed on the roads in enormous quantities. Many thousands of tons per annum have been disposed of; and the loss to the gas companies by wasting the volatile products of tar has been enormous.

It has been previously stated that forces are now at work which will undoubtedly have a permanent effect in preventing waste of valuable tar products which have previously gone unchecked. Throughout the whole of the gas profession there has developed a quickened interest in the possibilities of coal gas tar; and for a number of reasons this interest has centered on the dehydration of tar, or, to use a better term, partial distillation of tar.

A question often asked is. "Where and how can the prepared tar and distillates be sold?" The answer depends again upon local conditions and the local authorities. Where the latter use considerable quantities of prepared tar for road purposes, the solution of the difficulty is a comparatively a simple one. In such circumstances the prepared tar can be sold with little trouble, and the light oils can be sent away for further purification. But there are many cases where the local authorities are not sufficiently enlightened as to the real value of tarred roads; and unless there is positive assurance of an outlet in other directions, the installation of a deyhydrating plant, or rather the disposal of the products arising therefrom, would create a source of trouble.

Various methods of tar dehydration have been attempted, some of which will be described.

(1) CENTRIFUGAL PROCESS.

The principle underlying this process was the fact that there is a difference between the specific gravity of tar and water or ammoniacal liquor. Tar at rest in a tank will separate from water by gravitation. The tar, being heavier, sinks to the bottom, while the water rises to the surface. The ordinary gravitation process is somewhat slow, and it was proposed to accentuate the force of gravity by a cylinder rotated at a high speed on a vertical axis—like the centrifugal machine used for drying sulphate of ammonia. The rotating basket of the machine did not, however, contain any perforations. Tar was allowed to flow continuously into the machine, and being the heavier body, settled against the wall of the basket; while the water clung to the inner face of the tar. The water was removed by a skimmer; while the dehydrated tar passed over a lip at the top of the basket, and between the drum and the outer casing of the machine. By this means, tar could be obtained containing no more than 1% of water. This method was fairly successful in removing free carbon from coal tar.

(2) INTERMITTENT PROCESS.

Much of the prepared tar now procurable is obtained by the intermittent process. An ordinary tar-still, holding from 10 to 20 tons is charged with tar. Frequently, the tar has received a preliminary treatment with steam for the removal of surplus water. The distillation process is then carried to such a point that the whole of the water, and a portion of the volatile oils, are removed. The degree of distillation depends upon the quality of the prepared tar desired.

The main difficulty is in the commencement of the process, when the boiling tar develops a tendency to froth or "prime," with the result that the tar escapes into the condensing system.

Considerable skill and experience are necessary for the successful working of the tar-still for the production of prepared tar; but, otherwise, it is capable of producing satisfactory results.

(3) THE CONTINUOUS PROCESS.

The most successful results in tar dehydration have been obtained by the continuous plant. In the British Isles upwards of 120 continuous dehydrating plants are at work, or in course of construction; while probably the number of intermittent plants at gas works can be counted on one hand.

The general advantages of the continuous process are:

(1) Continuity of operation.
(2) Low fuel consumption.
(3) Reduced wear and tear of plant.
(4) Small area occupied.
(5) Low supervision charges.
(6) Low cost.

Before going fully into the working of a continuous plant, it may be advisable to refer briefly to the light oils produced in the dehydration process. At the present time, these oils are of special interest, while even in normal periods they are of very considerable importance. Reference has been previously made to the fact that light oils consist of a mixture of benzol, toluol, naphtha, carbolic and cresylic acids, together with a little naphthalene and creosote oil. The quantities got from a ton of tar vary according to the temperature at which the distillation is carried out.

The Roads Board authorities have issued three specifications. These are:

(1) Prepared tar for tar spraying.
(2) Prepared tar for tar macadam.
(3) Tar for pitch grouting.

The working temperatures necessary to comply with these specifications are:

For tar spraying..... 450° F. or 230° C.
" tar macadam..... 500° F. or 260° C.
" pitch grouting..... 550° F. or 288° C.

It will be understood, therefore, that when working at a temperature of 230° C. for the No. 1 specification, the distillates will contain a higher proportion of lower boiling-point oils than is the case when distillation is carried out at one of the higher temperatures named. The quantities of the distillates, also, vary according to the temperature at which they are produced, as shown in the following table, which (in addition) gives the quantity per ton of tar distilled, of tar acids—carbolic and cresylic—crude benzol and crude toluol.

Roads Board Specification.	Working Temperature.	Quantity Distilled. Gallons.	Gallons of Crude Tar Acids per Ton.	90 Pr. Ct. Benzol per Ton of Tar.	90 Pr. Ct. Toluol per Ton of Tar.
No. 1....	230° C.	25	4	3	2
No. 2....	260° C.	29	5	3	2
No. 3....	288° C.	34	5	3	2

Quite apart from the Roads Board specification, at the present time it is exceedingly important that the whole of the benzol, toluol, and phenol should be removed from crude tar; and for this requirement the working temperature in a tar dehydrating plant should not be less than 260° C. or 500° F., with the thermometer in the tar.

A dehydrating plant (such as is hereafter described) will satisfactorially remove the toluol and benzol taken up in the gas-washing process; and a number of such plants are at work for the purpose.

The disposal of light oils is worthy of a little consideration. In most cases the light oils produced are sent away in barrels or tank wagons for further refinement. Where a satisfactory price can be obtained for the oils, and particularly where they are produced in small quantities, this may be regarded as a suitable arrange-

ment. When, however, the quantity of tar dehydrated approaches 10 tons per day, a small rectification plant, in conjunction with the dehydrator, is a profitable undertaking. The demand for the rectified products at present is much greater than the supply; and there is abundant evidence that after the war the demand will be continued.

Ten tons of crude tar dehydrated will produce 300 gallons of light oils. By using a simplified type of rectification plant 300 gallons of light oils will produce:

25	gallons of	crude carbolic acid
25	"	cresylic acid
30	"	90% benzol
20	"	90% toluol
40	"	solvent naphtha
150	"	light creosote oil

In various parts of the country, gas engineers have under consideration the erection of a central works on co-operation lines, whereby the light oils produced at several works will be forwarded to a central rectification plant, there to be converted into pure products. A central works would be able to place on the market considerable quantities of motor spirit; and it is being suggested that, as the works progress, attention will be given to the manufacture of intermediate products for the aniline color and allied industries.

Within a very short time, there is good reason to hope that these proposals will materialize, as it is only by such methods that Great Britain will become less dependent upon outside sources for supplies of those materials which are absolutely essential for the security and continuity of her great industrial undertakings.

HIRD, CHAMBERS AND HAMMOND'S DEHYDRATION PLANT.

The accompanying cut shows this type of dehydrating plant.

Hird, Chambers and Hammond's Patent Continuous Dehydration Plant.

One of the greatest difficulties in tar distillation is the removal of the water from the tar. In the ordinary type of distillation plant, great care has to be exercised in the earlier stages of distillation. Once the water has been removed, the completion of the distillation is a matter of little difficulty.

While water, and possibly free carbon, are the cause of the trouble in the intermittent pot-still method, nevertheless priming or frothing and bumping would not occur except for the fact that in the still there is a depth of tar often exceeding 8 feet, while the maximum vapor space from the surface of the tar to the still-head will be 3 feet. When "bumping" takes place at the bottom of the still, the body of the tar becomes honeycombed with the liberated vapors, causing the tar to swell considerably in volume. The vapor space is not of sufficient capacity to contain the expanded tar, which must pass out of the still and into the condensing apparatus. To avoid bumping and frothing or priming, it is absolusely necessary to have an apparatus wherein the tar would not have a greater depth than 6" over the heating surfaces, and the vapor space above the tar at least five times that of the depth of the tar.

In this continuous plant the depth of the tar over the heating tubes does not exceed 6 inches; while the vapor space about the surface of the tar is not less than 2 feet 6 inches. With this arrangement it has been proved that, in plants having a capacity of 20 tons of tar distilled per 24 hours, even water gas tar containing 40% of water can be dehydrated without trouble.

Wrong methods of heating tar distillation plants has caused much trouble. In the underheating methods as applied in the ordinary pot-still process, even when the utmost care is bestowed upon the heat regulation, it often occurs that the tar in the still becomes carbonized and adheres to the still bottom. The transmission of heat from the fire to the tar is, therefore, retarded, while the bottom plate becomes overheated, and rapid depreciation of the still bottom takes place.

In the illustration it will be observed that the heat from the coke-breeze furnace passes through horizontal tubes near the bottom of the still. This method of applying the heat to the tar has several advantages. The heat is evenly distributed throughout the mass of the tar. There is rapid circulation of tar around the heating tubes—preventing the deposition of free carbon on the heating surface, and ensuring a rapid transmission of heat through the tubes. The tubes are expanded into the end plates, with the idea that, if for any reason they become defective, they could be easily removed and replaced. The first plant installed commenced working about 2½ years ago, and to-day the tubes are in first-class condition.

Either gas or coke breeze may be used for heating. When gas is used, suitable bunsen burners are supplied; each tube fitted with an independent abjustable burner. Coke breeze is, of course, a cheaper fuel than gas. The latter, however, requires less attention, and is, therefore, preferable for plants having a maximum capacity of 5 tons of tar per 24 hours.

In comparing the costs, much depends on the value set for gas. In actual practice, it has been found that a ton of tar can be distilled to conform to the No. 2 Roads Board specification (260° C., 500° F.) on a consumption of 67 lbs. of coke breeze. With gas heating, a ton of tar will require 550 cubic feet of 500 B.T.U. gas.

The prepared tar on leaving the plant has a temperature of from 230° to 260° C.; and means have been adopted for conserving this heat. The raw tar, before entering the plant, flows through a horizontal heat interchanger, and thereby the ingoing tar is heated to 100° C.; while at the same time the outgoing prepared tar is cooled to such a temperature that it can be discharged either directly into casks or into receiving tanks.

The water and light oils driven off in the distillation process are condensed by the ingoing tar. As the light oils represent only 15% of the total weight of tar entering the still, condensation is complete; while the temperature of the condensed light oils is sufficiently high to prevent the crystallization of naphthalene in the condensing coil and in the seal-box.

It is compulsory in all tar distillation processes to make arrangements for conveying the uncondensed gases from the plant to some form of purifying apparatus. These gases consist chiefly of sulphuretted hydrogen, with some ammonium sulphide. A small oxide purifier fully meets all requirements. The seal at the plant is carried to a depth of 3 inches; and the fouler vapors are conveyed directly to a small purifier—generally about 4 feet square by 2 feet deep, with one grid—containing oxide of iron 1 foot deep.

WORKING OF THE PLANT.

The crude tar, fed by an overhead tank or direct from a pump, enters the heater, which is fitted internally with a cast-iron condensing coil. The cold tar condenses the light oil vapors in the heater, and is itself warmed by the hot vapors. Leaving the heater, the tar passes to the heat interchanger, where it takes up heat from the outgoing dehydrated tar. From the heat interchanger the tar enters the still, a rectangular tank with a flat bottom and fitted with baffle plates, so that the course of the tar is controlled. It flows from the cooler end of the still by a circuitous route, until it finally reaches the hottest part of the heating tubes, by which time the dehydration is complete. The hot tar then leaves the still, and passes through the heat interchanger into the receiving vessel. The light oil and water vapors driven off are condensed, as already stated, in the heater.

The process can go on continuously night and day for fairly long periods. Plants are at work which make continuous runs of nine to ten weeks, when it becomes necessary to stop the plant for general inspection and cleaning.

In order to vary the quality of the prepared tar it is only necessary to adjust the tar-feed. Once adjusted, any temperature can be uniformly maintained.

The apparatus can be worked in close proximity to dwelling houses without creating a nuisance; and no complaints whatever have been made.

Operating charges depend, of course, on the type of apparatus. Results obtained in the type of plant described, having a capacity of 24 tons of tar per 24 hours, are as follows:

Per Ton of Tar.

Fuel—67 lbs. coke breeze at $2.50 per ton	$0.075
Labor	.125
5% interest and 10% depreciation	.055
Rent, rates and taxes, office and management	.025
	$0.280

Products Obtained.

160 gallons prepared tar at 6 cents per gallon (at works)	$9.60
30 gallons naphtha and light oils at 10 cents per gallon (at works)	3 00
10 gallons liquor	.25
	$12.85
Less working costs	.28
Net value of products from 1 ton of tar	$12.57

In another plant of similar capacity, using coal gas instead of coke breeze, the net value of the products was $12.25.

These figures are for crude tar. Tar that has been used for gas washing will give somewhat better values.

The dehydrating plant forms the first unit of a complete tar distillation plant for the production of naphtha light oils, creosote oil, naphthalene, anthracene oil and pitch. A number of installations are now in hand, that will ultimately be converted into complete tar distillation plants.

From experience gained by close association with many gas undertakings, there is little doubt that the question of tar disposal is one having very serious attention; and there is a strong probability that the future will bring about a considerable development in working-up of tar by the actual producers.

Reaching Thousands of People by Means of the Lantern.

By J. W. Fuller.

To be allowed to speak to groups of 50, 100, 200 or 500 people at a time, and tell them an interesting and attention-holding story about something that is usually a dry and unattractive subject—such as gas, is a feat not often undertaken by even the most energetic of gas men.

Nevertheless, that is what George W. Allen of the Consumers Gas Company, of Toronto, is doing at the present time with his very interesting and instructive lecture, "The History, Manufacture and Uses of Gas," which he has been giving and is booked to give to clubs, lodges, young peoples associations, colleges, schools, and other gatherings in the city of Toronto.

The following article, inserted in "Gas News," the company's house organ, started the ball rolling and resulted in many demands to hear the lecture:

Free Lectures.

Notice to Secretaries of Educational Classes, Schools, Clubs, Lodges, and other Associations.

Believing that there are a number of people in Toronto who are not familiar with the process of gas making, and who would like to know something about this great industry, a lecture has been prepared entitled: "How Coal Gas is Made," the lecture being illustrated by lantern slides.

The Consumers' Gas Company Educational Association will provide for a limited number of these lectures, to be given free during the coming winter months, to those associations whose secretaries or educational directors make early application for same.

No charge will be made for lecturer, lantern or time. Address applications to Educational Director, Consumers' Gas Co., 19 Toronto street.

By means of lantern views, Mr. Allen goes back into early history, by telling the story of a lump of coal. He brings out how it was formed, and how, step by step, coal has come to be recognized as an article indispensible to men.

He then takes the audience to the time of rush lights, tallow dips, pine torches, and gradually, through an interesting series of pictures, tells of the evolution of lighting appliances up to the present time.

The history and story of gas manufacture follows. The ups and downs of the early investigators, Murdock, Lebon, Minckelers and others, are told in an interesting way, and views of some old type gas plants are shown.

The list of valuable by-products of coal and coal tar proves very interesting and enlightening.

Interspered are interesting and amusing features that tend to keep the technical parts of the lecture from becoming too tiring.

Following the talk on gas manufacture, and a trip through the Consumers' Gas Company plant, are a large number of slides picturing the large number of uses for gas. This is followed by views showing the interior of shell manufacturing plants, where gas furnaces are pictured in shell making work.

Some statistics on the enormous development of gas undertakings of recent years, ends a lecture that certainly helps to keep gas before the people of Toronto.

Mr. Allen's gas lecture is the most complete one on this continent, if not in the world, and has been put together by him, step by step, until it is worth while listening to.

It is so arranged that no matter whether the audience is of children, ladies or gentlemen, or scientific and mechanical men, it can be made to appeal strongly to all.

Mr. Allen gives these lectures entirely free, and has quite a number of evenings booked ahead. Some of the public schools have asked for it, and this, no doubt, will result in more requests.

Liquid Sampling Specifications.

From report of a committee to the American Society for Testing Materials.

In view of the difficulties of securing representative samples from tank cars, the committee deems it advisable to draw up specifications covering this condition of sampling.

It is obvious that a thief (a tube or other device for withdrawing a portion of any liquid from its container) inserted along any diameter of a cylindrical tank car cannot take a sample representing the contents thereof; although if proper care is exercised in calculating the capacity of any section of the tank car, in designing the sampler and in carrying out the operation, an average sample can be obtained. Yet the difficulties attending the securing of a sample by means of a thief, whose cross-section is proportional to that of the tank car, or by drawing with a cup device from different points (calculated to the volume of liquid per unit depth at that level), are so numerous and fraught with such risks of inaccuracy, that it is deemed advisable to eliminate such methods from consideration. The fact that the presence or absence of foreign materials (such as water in oil) in the commodity shipped, is not alone to be determined, lends force to this decision; for instance, in the case of linseed oil, where many specifications allow a certain percentage of matter in suspension, it is essential to have the samples show an average of material comprising the shipment.

A general method of securing samples, that permits of modifications, is to draw a portion from the pipe line used to transfer the liquid from the car to storage tank. Inasmuch as conditions obtaining at various plants complicate the operation seriously, the committee does not feel warranted in drawing up specifications. If a suitable cock is placed in the bottom of the transfer line, preferably near the car, and the liquid dripping therefrom is caught, an average sample would be obtained.

Another way is to take samples at regular intervals from the stream at point of efflux. To insure accuracy the stream must flow with constant head, and the samples be taken frequently enough to obviate the effect of sudden variations of quality. It is seldom that access can be had to the stream at or near the car. This adds an element of uncertainty, emanating from the previous contents of the pipe line used to convey the liquid from the tank car to the storage tank, and the possibility of leaks.

Another modification consists of the diversion into a suitable receptacle of a portion of the stream at the point of efflux by inserting a tube or V-shaped strip of metal therein. Spattering of the stream or appreciable variations in pressure would affect the accuracy of this.

Telephone - John, 2996.

THE AMERICAN GAS LIGHT JOURNAL

Cable, - Am-Gas.

Entered at the Post Office, New York City, as Second-Class Matter.

Published Weekly at 42 Pine Street, New York City.

SANFORD K. CAMPBELL, Editor.

E. P. CALLENDER, Pres. and Treas.
F. A. SOUTHWORTH, Vice-Pres.

CHARLES H. WADELTON,
Secretary and Manager

NEW YORK, MONDAY, DECEMBER 20, 1915.

Selling the Public What It Wants.

The United Cigar Stores are looked upon by many as being a grasping monopoly; and the reasons for their success are seldom analyzed. One of the reasons is the variety of stock they offer. In even their small stores the number of items carried in stock totals nearly 2,000; and half again as much in some of the big ones. In addition to the large line of their own manufacture, they also offer for sale any brand for which there is a demand, whether it is made by themselves or by some one else.

Contrast this policy with, not the average gas company, but *any* gas company. Did you ever hear a gas company offer to get a certain make of appliance for a consumer just because he asked for it? They think it too much trouble; and this policy has been killing the goose that lays the golden advertising eggs.

What incentive has a manufacturer to do National Advertising when, in every town where his goods are not handled, the sale will be lost to him?

Some of the success of these cigar stores is due to their willingness to handle any goods the people want.

The Same Reason Applies to America.

A recent number of "Science Progress" contains the first installation of an article on "The Influence of Research on the Development of the Coal Tar Dye Industry," by Dr. F. A. Mason. An interesting account is given of the origin of the industry in England, and especially of the parts played by Perkin, Hofmann and Caro, early investigators. Dr. Mason makes it clear that the reason why the industry, although it was started in England and for a time made considerable and promising progress in that country, subsequently became the monopoly of Germany, was the lack of British students of organic chemistry. "Both by nature and good fortune," he writes, "England seemed to be destined to be the great coal-tar dye producing country of the world; Great Britain produced more tar than any other country, the first synthetic dye was discovered here, and Professor Hofmann himself, at the Royal College of Chemistry, was the center of attraction of the industry; one thing only was lacking, namely, a sufficient scientific education of the general public, such as was already obtaining in Germany, and a sympathetic understanding and appreciation of the methods and objects of research. To this last is to be traced, directly and indirectly, the ultimate collapse of the British dye industry."

Civic Federation to Discuss Vital Questions.

At the annual meeting of the National Civic Federation, to be held in Washington, January 17, 18 and 19, 1916, the general topics for discussion will be:

"The legal and moral obligations resting upon foreign born citizens of the United States—those who have become naturalized citizens, and those who have taken steps to become citizens, as well as those engaged in labor or business here, but not intending to take out citizen's papers."

"The present and prospective effects of the war upon immigration to the United States, as it relates (1) to the wage earner, (2) to industry, and (3) to the body politic; and what, if any, new legislation is required to deal with this problem."

Among the reports to be made by special committees, will be one giving an analysis of over one hundred profit-sharing plans now in operation in this country, as well as a description of some abandoned ones and the cause of their failure. It will cover the methods employed in industrial enterprises—manufacturing plants, mercantile houses, public service corporations and financial institutions.

A plan will be presented for the organization of a commission to make a study of the question, "How far shall Government in this Country enter into Private Industry?" It will provide for a review of conditions in Europe, where the government is more and more taking over private industry, to determine whether it has resulted in such benefit that it will become the permanent policy, or is it tolerated as a military necessity.

The Industrial Economics Department will make a report on its survey of the social and industrial changes that have taken place in the United States during the last generation. The object of the survey is to summarize the changes in our national life, and to gather together the essential material from which to judge where there has been an advance in well-being, where a loss, and how far, in the aggregate, gains and losses balance or outweigh one another. It will show what is being done by employers for the physical well-being of wage earners; to provide for leisure time; to assist in the education of their children or increase their own efficiency; to provide comfortable, sanitary homes at reasonable prices, and to insure them against misfortune resulting from industrial diseases or accidents, old age or family sickness.

Development by Private Capital or by Taxation?

The Industrial News Bureau, of Portland, Ore., says: "It has been sought to make this question an issue in city, State and National politics, but neither position is sound from the public standpoint. The real public interest lies in utilizing both systems; as one alone leads to monopoly, and the other to confiscation. The city, county or State cannot be denied the right to take up the development of lands, water, gas, electricity, or railroads and canals. The demagogue seeks to array one system against the other, and he may be a demagogue for public ownership, or for private corporations. There should be municipal freedom in undertaking public ownership, but it should not be done to drive out private capital. When public ownership of public utilities is used as a club to destroy private capital or its fair earnings, there is a reaction against the community. Capital will shun such a community and then injury is done, and it takes a community a long time to recover. To speak of large public utility and public service interests as selfish interests, or organized greed and monopoly, is almost a crime. Development enterprises that do not yield a profit are the worst advertisement a State can have. They overbalance all the boosting enterprises. Without private capital being free to come in and earn fair profits, the development of the Northwestern States is almost impossible. It would force these States to assess the taxpayers to develop their resources, and roll the cost of government mountain high. The two extremes, monopoly and confiscation by taxation, are to be avoided, and both systems, under equal regulation and in fair and open competition for the best results, must be encouraged."

EMPIRE STATE GAS AND ELECTRIC ASSOCIATION.
December Meeting—Gas Works' Methods.

A meeting every month, is the ambitious program for this year being carried out by the Empire State Gas and Electric Association, under the direction of Secretary C. H. B. Chapin. The work is laid out so that there will be greater opportunities for the men in the manufacturing and distribution ends, to attend the meetings and add to the value of the discussions.

This meeting, under the direction of the Gas Production Committee, as noted in last week's JOURNAL, was held Dec. 10, in the office of the Chuctanunda Gas Light Company, at Amsterdam, N. Y. Chairman F. S. Dunn, Supt. of the Municipal Gas Company, Albany, had charge of the meeting, assisted by the secretary of the committee, V. von Starzenski, Supt. of the Mohawk Gas Company, Schenectady.

The morning session was devoted to the use of Pyrometers, the topical discussion being opened by F. J. Jennings, Supt. Westchester Lighting Company, Mount Vernon. He stated that, from a large number of tests it was found that the most accurate point in a water gas set to place the thermopile was near the bottom of the superheater at about the level of the sight holes. With the oil they were using, they operated at 1400° F. at this point.

In obtaining the desired temperature it was found that air and steam meters were of material assistance, and that lowered operating costs resulted. With relation to proper combustion, it was found that better results were obtained when the checker brick of the superheater are set with 2″ openings at the top, 2½″ in the middle and 3″ at the bottom; the brick in the carburetter being spaced 3″ in the bottom and 2½″ at the top.

Promptly at noon the 40 members in attendance sat down for luncheon at the Hotel Barnes, and after a short time for visiting all returned to the meeting room where the afternoon session began promptly at 1:30. "Holder Heating," the fisst topic, was opened by M. G. Welch, of Schenectady, who described some tests with siphons. Tests were made with steam at pressures of from 10 to 80 lbs., and it was found that the maximum absorption was at about 55 lbs.

Only half of the plants represented at the meeting took temperature readings regularly, and most of them reported 60° as being the desired condition. After discussion it was agreed that 40° to 45° was sufficient, if the attendant had time to see that this was maintained.

H. C. Shields of Troy said that little had been written about holder temperatures since Mr. C. J. Ramsburg's paper. (See AMERICAN GAS LIGHT JOURNAL, Oct. 26th, 1908.)

Mr. G. E. Crosby, of Boston, advocated hot water instead of steam heating, and said that ordinary jets were just as efficient as siphon jets. The latter will clog with scale, and are rarely fitted with the proper size orifice to handle the desired quantity of water. The best results are obtained when the highest velocity is attained, and with the least disturbance of the surface of the water in the cups. At Rochester they have covered the cups of a large holder with a canvas windshield, which has materially reduced the steam consumption. This shield prevents the water from splashing out in high winds, and keeps out snow.

Anchor ice can be prevented by keeping the pits clean of tar, and by running the jets down to the bottom and along the sides. One small holder in the Boston district is supplied with hot water heated in a gas fired boiler, with an electric driven pump for circulating.

The short discussion on Boiler Compounds, which closed the session, showed that no two minds were alike, although the subject was agreed to be of importance.

Through the courtesy of the American Gas Institute a moving picture of Safety Methods in Gas Works was shown at a local moving picture house at 5 P.M., immediately following the session. The trip of the film was eventful, as it arrived in New York that morning, and Secretary Chapin brought it as for as Schenectady by train and then by auto, with the help of the vice-president at Schenectady, Mr. Harry W. Peck. Mr. Peck, by the way, has added another to his many duties. He has accepted the presidency of the local Board of Trade.

The films brought very forcibly to attention many of the important things about which so much has been written in the past few years. One of the objects in showing it was to acquaint the members with the fact that it may be borrowed from the Institute should any of them care to exhibit it to their employees.

The coming gas meetings of the Association are scheduled as follows:

1916—Feb. 11—Gas Distribution Committee in Yonkers.
May 5—General Meeting in Buffalo.
June 9—Gas Production Committee in Coney Island.
Aug. 11—Gas Distribution Committee in Oswego.

I. E. S. Council Meeting.

A meeting of the Council of the Illuminating Engineering Society was held in the general offices of the society, 29 West 39th street, New York, Dec. 9, 1915. The American Optical Company, Southbridge, Mass., and the Malden (Mass.) Electric Company were elected sustaining members. Mr. M. W. Allen was elected a member, and the following were elected associate members: A. C. Babson, Wm. G. Houskeeper, S. L. Marlow, Hiro-Yoshi Oshima, Robert H. Ruth, James J. Spillan. Ten associate members were transferred to the grade of member.

Dr. E. P. Hyde, director of the Nela Research Laboratory, Cleveland, O., was appointed chairman of the Committee on Lectures. The society is arranging for a course of lectures in illuminating engineering to be given in the fall of 1916. The University of Pennsylvania has invited the society to give the course in Philadelphia. Mr. W. A. Durgin was appointed chairman of the Membership Committee. Those present at the meeting were: Charles P. Steinmetz, president; E. M. Alger, C. O. Bond, H. Calvert, G. A. Hoadley, Clarence L. Law, C. A. Littlefield, L. B. Marks, Preston S. Millar, J. L. Minick, A. S. McAllister, J. Arnold Norcross and S. C. Rogers, representing C. A. B. Halvorson.

Annual Meeting, Society of Gas Lighting.

The Society of Gas Lighting held its annual meeting at the Hotel Astor, New York city, on December 9th, the election of officers being the only matter of interest. The dinner was of the usual kind, excellent; and the attendance of 28 showed that the interest in the society's work continues actively.

The election resulted as follows:

President—Col. F. S. Benson.
Vice-President—Alex. H. Strecker.
Secretary—Geo. G. Ramsdell.
Treasurer—Wm. Cullen Morris.
Member Executive Committee—W. H. Bradley.
Finance Committee—W. J. Welsh, Chairman; W. F. Lawrence, R. W. Bush.

Institute Meeting in Chicago.

The Directors of the American Gas Institute, at their December meeting in New York, decided that the next Annual Meeting of the Institute should be held in Chicago, on the 17th, 18th and 19th of October, 1916.

Loyalty of Corporation Employees.

By R. H. BALLARD, to the Los Angeles Section in the American Institute of Electrical Engineers.

Why are corporation employees the most loyal workers of the world?

Because down through the long line, even to the new recruits, hope is the inspiration, there is no fear to impair efficiency; the square deal is every man's due, and woven in with every day's work, is the purpose ahead. Each worker knows that the company is trying to help him achieve the highest for which he is fitted, and that his superiors are his friends, his co-laborers are his partners, and that within the organization lie his present and his future. He is encouraged to achieve—not goaded on by carping. It is practical day by day living out of the Three Guardsmen slogan—"One for all; All for one."

When a body of men gets this one big-family thought ingrained in their systems they forget to be little. The employee with a big thought that embraces his boss and his work-mate and his work, has neither time nor disposition to knock. Genuine down-in-the-heart loyalty is the great antidote for knocking.

Among the things that we try to do is to develop the human load-factor. The corporation represents the brains and the work of many men merged for one purpose. The man is the unit. The higher the potentiality of each unit, the higher the potentiality of the organization.

A great many of our men have been with us since the organization was an infant. Their love for the company and their loyalty to it is something inspiring; like the comradeship of veterans of many campaigns. It is contagious. When new recruits join our ranks they get the spirit before they know it.

Fitness, mental and physical, is a necessary requirement for entry into an organization that has perpetuity as an object. An applicant for employment is required to pass a physical examination, after which our physicians look after his physical well being. Each employee pays a nominal monthy fee, but the expense of maintaining the department and hospital service, is borne by the company. Our chief surgeon and his assistants watch over the health of our men and women with the care and fidelity of family physicians, and naturally this engenders many tender ties.

We have a benefit fund, in the nature of mutual insurance. This had its inception with the employees themselves, and the company only stood sponsor for it until recently, when by vote of the members the company was asked to take entire charge of the fund. It has been in existence for 5 years and has paid losses totalling $21,699. The average payment has been $943, and the average monthly cost 40 cents per member. One of the best features of co-operative insurance is that there is no delay in the payment; sometimes within an hour after a members death the money has been paid to the family—not as a charity but as a right.

We have a safety committee composed of members of the engineering and operating departments, who systematically instruct our employees in means of bodily safety, and endeavor to safe-guard them in their labors and life.

Long and faithful service is encouraged, and employees who try to do their best are not harassed by a fear of losing their positions. If a failure is made in any particular line of work, we try to find a place to which the individual is better fitted, as in a big organization there is usually opportunity to fit the employee to the work. An insignia of service has been adopted in the form of an emblemetic button, indicating the number of years the employee has been in service. While this is literally a badge of honorable service, it symbolizes the bond of mutual interest that exists in the organization.

A circulating library is maintained by the company, providing technical and other instructive reading pertaining to the business; and subscriptions to the leading trade journals are either provided for the employees, or the expense partly shared by the company. Weekly meetings of the commercial men are held for the purpose of education and business interchange.

What we term our district agents' meeting, but which are attended by officers, heads of departments, chief clerks and other employees who evince a desire to master the problems of the business, are held nearly every month. At these meetinge the problems of the business are discussed; policies are formulated, and pleasant personal relations cemented. Many small meetings are also held.

To keep our employees in touch with the broader sphere of electrical achievement, we pay half of the expenses of all who join the National Electric Light Association. They receive all of its literature, which is inspiring and educational.

We publish a monthly house organ, "Edison Current Topics," which has for its object the education of the men who are not able to attend the agents' meetings, and to keep them in touch with the officers and their co-employees, and with the policies of the company. Its articles are almost entirely contributed by employees, and treat business, technical and public questions from the standpoint of the practical man who is doing the work.

Our employees are never asked to do anything dishonorable or contrary to clean business methods. It naturally follows that they respect their employers and respect themselves. The open-door—the democratic policy, exists through the entire organization. There are no barriers that prevent an employee from talking freely and frankly with his superior on business or personal matters.

We always try to show appreciation of good work, and let no opportunity pass to commend enterprise, energy, efficiency and merit.

It is most gratifying to note the effect these things have upon our men. We have come to take it for granted that every one is striving to give the company the best that is in him. While we are not lax in discipline, or indulgent with those who persistently and wantonly disobey, it is astonishing how remarkably few instances arise where severe measures must be resorted to. The "call on the carpet" and "the bad half hour" are infrequent, and "the third degree" is unknown. In the belief that we are all trying to do our best, we realize that it is human to err. When a foot slips or a head goes dizzy, there is always someone who slips his arm around the delinquent one and whispers in his ear, "Old Pal, you're not doing right by the company, and that means that you're not doing right by yourself," and that usually suffices.

The problem of the business man of to-day is to give personality to the great impersonal corporation he directs. Personality implies the human, and it must be drawn from the human element in the organization. To reach this human element, you must forge a link of mutuality and co-operation between the employer and the employee. You have to arouse him to the plane of "sympathetic service," which means the success of both himself and the institution, and is the influence that affects and determines his personality, the aggregate of which reflects itself in the personality of the business. To do this you have to appeal to the inner fibre of the man, which contemplates his material and mental welfare. He is to be taught to work not only with hand and head, but with heart, and he must be afforded scope for his individual ambitions, hopes and expectations. The employer, as represented in the corporation, has to develop a conscience and the employee imbued with this conscience.

We try to make the feeling in our organization as close and loyal as that of a college fraternity. "Me and the President" is a term which aptly expresses the feeling of relationship that should exist between the employee and the firm. If the employee considers himself a direct partner of the president, he will work better and the president will fare better. The esprit de corps. or as it is affectionately termed in our organization, the Edison Spirit, is a real and tangible thing. It has been carefully nurtured from the first and is not new or visionary. It has a definite meaning to the employees in their relationsbip to each other and to the company.

Deeper and better than all the rest is that confidence which exists between us. It is manifest in the interest we take in each other. It is good when we can step between someone who is opposed and the loan shark; it is better to see the president and the general manager go to the sick bed of some sufferer.

Yes, gentlemen, corporation employees are the most loyal employees in the world.

Do you wonder at it?

Natural Gas Leakage.

At a recent hearing before the Public Utilities Commisson of Kansas, on application from the Kansas Natural Gas Company for authorization of an increase in rates, R. M. Snyder, of Independence, a large gas operator, testified. "Gas valued at $4,288,000 has leaked from the Kansas gas field, purchased by the Kansas Natural Gas Company from the Ransdell-O'Neill-Snyder interests, since they were taken over several years ago." He pointed out that such leakage is a big factor in increasing the cost of producing gas. His figures were based on the selling price for gas in Independence, and he said the loss amounted to one-third of the gross revenues of the Kansas Natural Gas Company from sales of gas since it purchased the field.

A GAS LIGHTED CATHEDRAL.

In Items of Interest Dec. 6th, we quoted a newspaper account of the lighting of the Cathedral of SS. Peter and Paul in Philadelphia. This illustration shows how the architectural beauties of the church are emphasized by the lighting and the good general illumination. In "New Business," for December, James D. Lee describes the installation. He says, in part: "The lighting of the Cathedral of SS. Peter and Paul, on Logan Square, in Philadelphia, is another notable achievement in the long list of successful gas lighting installations made during the last few years.

"Church lighting has been conceded, even by some persons in the gas business, to be the province of electricity. The nature of the lighting effects required the use of units that lend themselves most readily to decorative features. The usual practice of outlining arches and studding friezes with electric lamps was considered a necessary part of a lighting scheme. This was out of the question with gas lamps.

"The improved method of modern illumination has as a basic idea the desire to present the interior at night in the same relative values of color and prospective as by day. On this account the outline system of illumination is abandoned in favor of the newer method, where particular attention is paid to the occular comfort of the congregation.

"By reason of the few lighting hours in churches as compared with other buildings, the cost is of small consequence. Preference is given to a form of lighting dependable and convenient. As a matter of fact, the Cathedral is located in a district supplied by underground circuits, and the possibility of outages due to failure of electric service is very remote. We concede the convenience of electricity employing remote control switches and the latest approved wiring devices. Yet, gas lighting was considered, after the former electric installations has been completely renovated and the new circuits drawn in.

"There were the usual doubts and prejudices concerning deterioration and discoloration, improperly (and sometimes properly) attributed to gas lighting. The relative economy of gas over electricity could have no influence where there was a possibility of the valued paintings and frescoes being injured. In the future it should only be necessary to refer to the gas lighting in this Cathedral to down this prejudice.

"Unfortunately there are few buildings approaching the proportions of this Cathedral, which could serve as an example of what might be expected from a gas lighting installation. The one thing more than all else that enabled us to persuade those having the lighting under consideration was our thorough analysis of the illumination problem and the suggestions offered for its solution.

"A study of the trend of development in illumination revealed the effort everywhere made to diffuse the light. Semi-indirect lighting with gas was a proven success. With the low surface brightness of the bowls concealing the source of light, it would be possible to build up the illumination by reflected light from the bright walls and ceilings. The rich colorings in the frescoes, and the architectural beauty of the church should be revealed by the lighting, rather than lost in a dazzling light. The heights of the vaulted arches supporting the ceiling of the nave suggested the location for our semi-indirect fixtures. Arrangements were made for a demonstration. The fixture contained three 5-mantle horizontal burners, each controlled by a separate cock, to give various degrees of illumination, five, ten or fifteen mantles being available in the unit. It was originally hung 28 feet from the floor, and it was found that with ten mantles lighted one could read comfortably at a greater distance than would be enclosed within an area required to be lighted by any one fixture in the completed installation. The brightness contrast of the surface of the dish against the background of the supporting arch was carefully noted, as well as the position of the burners in the dish.

Originally, provision was made for four standards supporting dishes in the large area enclosed in the transept, but they were not thought necessary. By increasing the amount of light in four fixtures (two back of the transept and the first two on either side of the nave) we were able to make the illumination in the transept sufficient. The completed installation comprises twelve fixtures, six with 15 mantles and six with 12 mantles. The fixtures are massive in structure, but hang gracefully pendant within the supporting arch, losing in perspective any suggestion of clumsiness.

Domestic Fuel.

Paper by R. E. SLADE, to the International Gas Congress.

One of the most important branches of the business of a gas company is the installation of domestic fuel appliances. These appliances furnish a market for a very large part of the gas sold, with a great deal of satisfaction to the consumer.

Gas ranges were imported from England very soon after the erection of the first gas works in the United States, but they were very cumbersome, and this, with the high prices prevailing for gas, prevented the adoption of this means of cooking. Ranges were made in the Unites States by Musgrave of Cincinnati, and Sharp of New York in 1875, but it was not until the late eighties that the gas range was pushed by gas companies; gas rates having then been reduced and the gas range greatly improved. Other appliances followed, and gas companies generally organized New Business Departments.

At the present time domestic fuel appliances are of many kinds and makes, and may be classified as follows:

Burners for Cooking:
Hot plates of various sizes.

Cookers:
With or without broiling burners; and with various numbers of top burners.

Ranges:
Single oven,
Double oven,
Elevated oven,
Cabinet.

Water Heaters:
Circulating or tank heaters,
Instantaneous,
Automatic and automatic storage.

Heating Stoves:
Gas logs,
Gas fireplaces,
Portable heaters,
Gas heated steam radiators.

Miscellaneous:
Laundry stoves,
Clothes dryers,
Laundry mangles,
Gas irons,
Garbage incinerators,
Curling iron heaters,
Hair singers,
Nursery burners,
Chafing dishes,
Coffee percolators,
Water stills and sterilizers,
Fowl singeing burners,
Fowl roasters,
Water heater attachment for dish washing machines,
Pyrography burners,
Cereal boilers,
Burners for starting coal or coke fires,
Dish warmers,
Egg boilers,
Boiling stoves,
Refrigerating plants.

With the above might be included the non-gas-burning appliances, such as waffle irons, sad iron heaters, divided sauce pans, toasters, broilers, etc.

Appliances for Cooking.—These take the lead in numbers sold. "Cooking with Gas" has become a necessity, and the cooking appliance is usually the first purchased by the consumer. Requests for main extensions are many times accompanied by the statement that gas must be had for cooking.

A gas company should devote a large part of its effort in the new business line to the sale of cooking appliances. It is to this branch, principally, that it must look for increase in output. The cabinet, double and single oven ranges, the cooker, the hot plate, all should be borne in mind in endeavoring to increase the percentage of saturation of the territory. Each has its particular use, and intelligent placing is essential for satisfied customers. The cabinet range should be suggested if the consumer can afford the investment and the conditions of the kitchen allow, as it will prove the best installation by reason of the greater ease of operation. Manufacturers have brought out so many designs that it is possible to suggest this type for a large variety of installations; the short cabinet where the kitchen is small, or the cabinet with several ovens, broiler and warming closet, for the roomy kitchen of a large family.

The elevated oven range is not as popular as when first put on the market, as the back top burners are not as accessible as on the other types; and it is seldom used except where the space is very restricted.

The double and single oven ranges will probably be largely used for years. They do not offer as convenient a means of cooking as the cabinet type, but are an efficient appliance where purchase price is the first consideration.

Cookers are attractive to those who are unable to make the greater investment for a range This also applies to the hot plate, with or without a portable oven. The sale of cookers and hot plates should be encouraged only in cases where the customer cannot afford, or will not make, the investment for a range.

One of the more recent improvements in gas ranges is the flame burner-lighter, which has simplified the operation of gas ranges and is rapidly becoming popular. In this device, a small continuously burning gas flame, protected from drafts by an enclosing chamber or hood, is located in the center of the range top; and pressing a button flashes a flame from the central pilot to each top burner, igniting the burner without the use of matches.

A cooking appliance, when placed, is certain to be used, but the extent of its use is governed, to a certain degree, by the condition in which it is kept. While it does not require very much attention, it must be kept clean, and the burner posts and air intakes to the burners free from dust and dirt. Some companies find it pays to make periodical inspections to remedy any trouble that may arise in the use of the appliances, due to carelessness or ignorance.

While originally gas cooking appliances were only used during the summer months, their use is being extended more and more throughout the year. The only obstacle to their use during the whole 12 months has been that they do not heat the kitchen, nor supply hot water. In the newer houses these difficulties are not hard to overcome, as provision can be made for heating the kitchen from the central heating plant, and a coil can be installed in the furnace to heat water during the winter months. During the summer the gas water heater is an economical means of securing hot water, and it can be used to advantage in the winter months when the furnace fire is low and the furnace coil does not supply sufficient hot water. It is not so easy to provide means of heating the kitchen and supplying hot water in old houses, as the existing heating plants are frequently so small that they cannot stand the additional work. As these small furnaces wear out, however, it is to our interest to encourage the installation of larger heating plants, and we must work along this line if we are to secure results. In some sections, where houses are not provided with central heating plants, the coke heater, attached to the gas range, is an economical means of heating the kitchen; and in the extreme south, gas heaters are largely used.

Appliances for Water Heating.—The circulating or tank heater is undoubtedly the most important of this group by reason of its low cost. It has been greatly improved in recent years, and is now very efficient, and is a satisfactory appliance to the consumer and to the gas company as well. It is usually installed at the same time or after the range, and does not, therefore, call for additional expenditures for main, service or meter. It is very important as a factor in the all-year use of the gas range. There is, therefore, every reason for pushing the sale of this water heater. Many companies do not give the circulating water heater the attention it deserves, as is evident by the relative sales of this appliance and gas ranges recently. In a city of 250,000, a week's drive on circulating water heaters resulted in the sale of 1,370 of them, more than double the entire sales of the previous calendar year.

A recent design that is meeting with large sales, particularly for new buildings, is known as the combination water heater and boiler; in which the water-carrying parts and the gas burner are built within the boiler, so that the appliance occupies no more space than the ordinary kitchen boiler, making it particularly popular for apartment houses, where space is a consideration.

The Automatic Water Heater.—These are necessarily high priced compared with the circulating heater. They are perfected to a high degree, and should be urged where the consumer is financially able to stand the cost. A higher efficiency is claimed for the automatic than for the circulating types of water heater, and its great convenience usually results in a greater use of hot water, and larger bills for gas. It is a mistake not to acquaint a prospective customer with this fact, and the explanation will be better received before the sale than after. Attention should also be called to the advantage of self-closing faucets to prevent waste where these heaters are sold.

The Instantaneous Water Heater.—In some sections of the country this type of heater is very largely sold; in other sections it is not handled by gas companies. When its use is advised, it should be carefully installed. As it is necessary to place it near the place where the hot water is used, it is generally located in the bathroom, and this room being small and the doors kept closed when occupied, it is essential to install a flue connection, as the rate of gas consumption is high. The fact that this form of water heater does not supply hot water to faucets throughout the house restricts its use, and it will never be as popular as the other forms of water heaters.

Heating Appliances.—Gas for the entire heating of a house can only be urged where the cold season is very short, or cold days occasional through the winter season. It is extremely useful as auxiliary sources of heat, and before and after the season when

the coal heating plant is operated. In northern latitudes, where the use of gas for room heating is largely off peak load, the sale of auxiliary heaters can be pushed to advantage. In some sections of the south, however, where the heating season is very short and the load on the gas plant variable by reason of temperature changes, the sales of heating stoves should be very carefully considered. It may be found that the peak taken on renders the business an eventual loss to the company, by reason of the large capital expenditure for apparatus required to care for the peaks produced, and absolutely idle during a large portion of the year. While at present gas is only used for auxiliary heating in most localities, it is important to install the more substantial and permanently connected heating devices, such as gas grates and gas-heated steam radiators, if sales of gas for heating purposes are to largely increase.

Miscellaneous Appliances.—Space does not permit the discussion of these separately. They all have their particular special uses, depending, in degree of desirability, on local conditions. The laundry appliances should be carried by the up-to-date new business department, and urged for homes pretentions enough to have separate laundry rooms. The garbage incinerator is coming rapidly forward, and will in the future be a factor in the increased cleanliness of the "All-Gas Kitchen." Several types of gas-operated refrigerating plants are on the market.

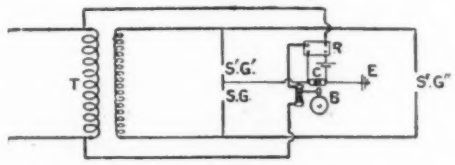
The nursery burner, and other small burners for special purposes, while not large revenue producers, are useful and convenient. They tend to popularize the use of other domestic fuel appliances.

The gas iron has been greatly improved within the past few years, and campaigns have resulted in the sale of large numbers of these convenient and satisfactory appliances. They are very efficient, and while the consumption of gas is comparatively small, there is undoubtly an indirect return from them, by rendering unnecessary the retention of the coal range for ironing day; and they have been a big factor in preventing the installation of electric irons in the homes of gas consumers, which frequently results in the use of electricity for other purposes.

New Methods and Appliances.

A SMOKE INDICATOR.—The top of the smokestack is often out of sight of the fireman in the boiler room, and devices by which he could observe the smoke issuing from the stack are useless. In the smoke monitor and recorder here described, this condition is reversed. Its purpose is to "watch" the fireman, to ring a bell and turn on a red light on the desk of the superintendent of the plant, to record the number of hours that the stack smokes—in short, to act as a conscience guide to the fireman—telling him when he is firing improperly, when he is wasteing fuel and when polluting the surrounding air. Its action is practically instantaneous.

The apparatus used is indicated in the accompanying diagram. *T* is a small step-up transformer of from 75 to 150 watts capacity, operating on 110 alternating current 60-cycle circuits, stepping up to about 26,000 volts. The high-tension side is connected to two sets of spark-gaps placed in parallel, $S''G''$ being in the smoke stack and SG, $S'G'$ under standard conditions.



Under normal conditions the gases from the incandescent fuel are intensely ionized, the ions consisting largely of electrons (near the fire bed if this is sufficiently hot) and thermions of molecular size. This results in the resistance of $S''G''$ being relatively low, so that a discharge takes place there in the form of a quiet arc-like brush. When dust or fumes are present in the gases the ions combine with the suspended solid and liquid particles, and the resistance of $S''G''$ is increased; so when the density of the smoke exceeds a certain value, the discharge is driven to SG and $S'G'$.

The remainder of the apparatus is essentially the same as that used in wireless telegraphy a few years ago. The oscillatory discharge takes place at SG and $S'G'$, to an electrode grounded through the coherer; the smoke stack, if of iron, may be used as an antennæ; the coherer operates the relay R through a small dry battèry; the relay operates an alternating-current bell, B, and any other signaling device that can be controlled by an electric circuit.

The relay can be made to operate a time-recording device, so that a permanent record may be made of the intervals during which smoke above a certain density is emitted by the stack.

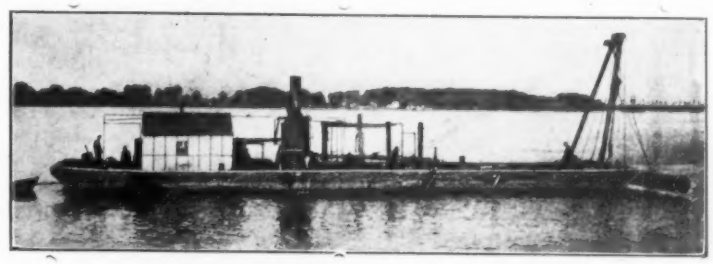
The apparatus contains no moving parts and is altogether automatic in its action. It can be carried from place to place, and connected to any lamp socket.

It should aid firemen and furnace operators to run their plants more efficiently, and should help materially in abating the smoke nuisance.

PROTECTING THE EYE FROM HARMFUL RADIATION BY CROOKES'S GLASSES.—In order to protect the eye from damage by radiations from luminous bodies, it is necessary to remove as completely as possible the ultra-violet and infra-red rays, for these, while taking no part in the vision of external objects, injure the eye structures that absorb them. The visual rays, when present in excessive amount, or when coming from a source in a position to form sharply-focussed images of filaments, mantles, etc., on the retina (eclipse blindness) also do harm and should therefore be reduced in intensity by neutral gray glasses. In the case of daylight, the modifying glasses should be worn as spectacles; for artificial illuminants they should be in the form of globes so as to limit the rays emitted to those useful for vision. For both purposes, the glasses recently perfected by Sir William Crookes are ideal. A glass compounded as follows, was found most efficient in removing rays likely to injure the eye: Soda flux, 96.8; ferrosoferic oxide, 2.85; carbon, 0.35. Its color is pale green, very pleasant to use, and the eye quickly becomes accustomed to the slight coloration. Color matches appear to be little affected by it.

CONNECTING CAST IRON PIPE UNDER WATER.—"Engineering News" gives an account of the laying of a new 36" cast iron water works intake at Quincy, Ills., to replace a 30" wood-stave pipe line. The initial operation in the laying of the pipe was to place four 12-foot bell and spigot lengths on skids, parallel to the shore line, and connect them together by ordinary lead joints calked by pneumatic hammer. These 48 foot sections were made up with a 6" bell forward and a machined spigot at the rear end. A bead had been cast on the pipe 18" from the special spigot.

The lead joint was poured into the 6" bell around a cast iron form turned to the exact shape and size of the machined spigot, and after the lead had set, the form was removed. Heavy steel clamps were bolted around the pipe back of the forward bell and around the bead on the spigot end.



Transporting 48-Foot Pipe Section to Submarine Trench.

When a section was to be taken out for laying, a large scow was anchored with the A-frame derrick over the section to be hoisted. Two hitches were taken around the pipe, which was hoisted off the skids; and the scow pushed out to an anchorage over the site.

When the trench was reached the section was lowered, and with the help of a diver the spigot end was led into the bell of the preceding section. Bolts were passed through the clamps bolted around the bell and spigot, and by tightening the nuts on the bolts, the spigot was forced into the cold lead in the bell. A diver then calked the lead around the pipe with a pneumatic hammer. The clamps and bolts were left on the pipe to strengthen the joints. No backfilling had to be done, as the sand drifted into the trench quickly, and within a few hours the pipe was entirely covered.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE Institute Committee, empowered to award the Beal Medal, for the best paper presented in 1914, has conferred that honor upon Frank W. Steere, of Detroit, Mich., for his paper on "An Electrical Process for Detarring Gas."

ZURICH, Switzerland, says that reports from Austria advise that the supply of coal in Vienna is so small that the question of lighting the city has become acute. The Burgomaster has appealed to the Government to provide coal for the municipal gas works, so that the capital may not be left in darkness. The cities of Laibach and Styria, it is reported, already are without gas on account of the lack of coal.

JAMES M. DODGE, one of the founders of the Link-Belt Company, and the inventor of many of its appliances, died in Philadelphia on December 4th. The most striking of his devices was the system of storing anthracite coal in large conical piles, and reloading it by machinery—accomplishing this with little labor and practically no breakage. The invention was so complete, and yet so simple, that it is still without a rival in the field of anthracite coal storage, and reduced the cost of handling coal, in and out of storage, from 30 and often 40 cents per ton per round trip, to less than 5 cents.

THE accident prevention motion pictures shown at the Safety Rally of employees of The United Gas Improvement Company in Philadelphia on December 9th, were arranged by the last Accident Prevention Committee of the American Gas Institute, under the direction of Jas. B. Douglas; and they are attracting considerable interest. In the reels many illustrations of the causes of accidents are graphically shown. One of the films of unusual interest to the gas fraternity at large, is that showing life pictures of the officers of the Institute from its beginning. The films was shown at the Safety Congress in San Francisco, and at the annual convention of the National Safety Council in Philadelphia. When shown before the employees of the Madison Gas and Electric Company, Madison, Wis., that company stated that the picture proved "far more educational than we had anticipated," adding that they "do not know a better way of explaining Safety First to employees."

OVER fifty ladies and gentlemen employees of the Consumers' Gas Company, Toronto, have formed themselves into a Glee Club, and are now rehersing for a two-night employees' concert to be given on or about January 25th–26th, 1916.

WALTER LEARNED, the banker and author, died December 12th at his home in New London, Conn., in his 69 year. Mr. Learned was vice-president of the Savings Bank of New London, president of the New London Gas and Electric Co., and an officer of several others. As an author, his chief volumes were his translations of the works of Francois Coppee and a volume of verse, "Between Times," published in 1899. He was a contributor to several magazines and editor of "The Treasury of Favorite Poems, 1891," and "The Treasury of Favorite American Poems, 1897."

EVERY Ohio man extends a congratulatory hand to P. L. Williamson and his wife. On Monday, December 6, they celebrated their golden wedding anniversary, and on December 16 Mr. Williamson celebrated the end of 44 years service for gas users of Cleveland.

WITH the object of determining whether a process invented by Dr. A. Broadbeck for making gas from crude oil is practical, the Sirus Heat, Light and Power Company filed articles of incorporation in Salt Lake City. Its officers are Dr. Broadbeck, president; J. P. Sprunt, vice-president; J. L. Cattron, treasurer; Samuel Wood, secretary. These, with H. C. Wood, compose the Board of Directors. The advantages claimed for the Broadbeck process gas is that it can be manufactured more cheaply than any coal product, that it does not require oxygen other than its own for its ignition, and that it gives a greater heat and brighter light than gas made from coal.

E. F. GOGGIN, superintendent of the Marlboro-Hudson Gas Co., and Robert W. Jameson, industrial fuel engineer of the Webber companies, on returning from the N.C. G. A. Convention, report that they had almost an exclusive interview with President Wilson. The other member of the party that met the president was William Gillette, the actor. They had a letter of introduction to Private Secretary Tumulty from U. S. Marshal Mitchell, but as there was a meeting of the cabinet, Mr. Tumulty said it was impossible to meet the president that day. The two Marlboro men were going through the White House when they received word that they could see the president in his private office. The president seemed to be in unusually good spirits and was smiling all during the interview.

ROSCOE Y. CONKLIN, who has been engineer of the Arlington (Mass.) Gas Light Company for some time, has gone to Daytona, Fla., where he has accepted a like position with the Daytona Public Service Company.

C. E. GRAY, JR., Superintendent at Fond du Lac, Wis., has been appointed by the American Public Utilities Company, manager of the Boise Gas and Light Company, of Boise, Idaho. He succeeds Charles N. Eymer, who has been promoted to assistant general manager of the Utah Gas and Coke Company, Salt Lake City.

J. E. ALDRED, Chairman of the Board of Directors of the Consolidated Gas, Electric Light and Power Company, notified the Alliance of Charitable and Social Agencies of Baltimore, Md., that the gas company will give $2,250 toward the $225,000 fund, to raise which a two-week campaign is now under way. Mr. Aldred made the announcement of the gift a few minutes after the adjournment of a meeting of the directors of the company. The board had not been approached in the matter, but after the question was brought up it was decided that the company should contribute and that 1% of the total amount would be a reasonable contribution.

THE Woman's Club of Huntington Beach, Cal., has filed a complaint against the West Coast Gas Company, asking that the company be compelled to furnish a continuous service of gas for domestic purposes, or that its franchise be forfeited and one granted to a new concern. The club says that often, for hours or for days, there is no gas supply, and that meal time seems the usual time for this lack to become apparent.

THE Ninth Annual Dinner of the Progress Club, composed of employes of the Brooklyn Union Gas Company, was held Thursday, Dec. 9th, at the Elks Club, South Oxford street. At the Guests Table with President J. L. Lewellen, were Walter Hicks, the toastmaster; L. S. Bigelow, J. M. Brock and F. B. Jourdan. There were over 150 members present and they voted that the entertainment provided by "Larry" Sharkey and others was nearly 1,000 B. T. U.'s in heating value.

HARRY W. PECK, vice-president and general manager of the Gas and Electric properties at Schenectady, N. Y., has been elected president of the Board of Trade. With Dr. Steinmetz on the School Board and H. W. on the "Come On" Committee we may look for California land values around the Electric City.

THE November report of the gas inspector of Lincoln, Neb., shows the quality of gas well above the 625 B. T. U. requirements fixed by city ordinance. The Council has delegated the city engineer to make an examination of gas pressure and the quality of the gas served to Lincoln patrons with a view to answering the many complaints made at the city hall during the last two or three weeks. The readings made were as follows:

November 11, 5:45 P.M.	686 B. T. U.
November 12, 7:00 P.M.	645 "
November 13, 5:30 P.M.	655 "
November 14, 1:00 A.M.	655 "
November 15	640 "
Average	656.4 "

What were the kicks about?

IN announcing a reduction in the price of gas for Norristown, Pa., beginning January 1, Manager H. H. Ganser of the Counties Gas and Electric Company said the cut was brought about by general growth of business. The small consumer will hereafter pay $1 net a thousand cubic feet instead of $1.10.

THE city of Wheeling. W. Va., is still losing money on the gas works, according to a report received by council in special session. It shows that the plant's expenses since July 1 has been $8,502.60; receipts, $6,429.47; net loss for the period, $2,073.19. During the month of October the operation cost $2,442.45, while its rereceipts were $2,315.56. Since July, 334 meters have been removed and 12 reinstated. In October there were 125 removed and 6 reinstated.

GEORGE H. COOK, General Manager of the Wisconsin Gas and Electric Company, is to be the municipal Santa Claus in Kenosha. Friends of the municipal Christmas are enthusiastic over the selection of Mr. Cook as manager. It is certain that he will make the movement even a greater success than it was last year.

ST. JOSEPH, Mo., has began burning mixed gas, and is lucky to have artificial gas to mix with the natural. The city's contention before the State Public Service Commission that $1 per 1,000 cubic feet for artificial gas is unreasonable, was not sustained, so the December gas bills will be figured at the mixed rate; $1 being charged for the proportionate part of artificial gas. For instance, if the natural gas supply is sufficient to supply two-thirds of the demand, the man who uses 3,000 feet of gas will pay $1.80, one-third being at the $1 rate, and two-thirds at the old 40-cent rate.

A MONTH or so ago the city aldermen of Sault Ste Marie, Mich., said that there had been some complaints in regard to the quality of gas being distributed by the Soo Gas and Electric Company, and an investigation was ordered. Expert tests were made, which purported to show that the supply, occasionally at least, was not up to standard. The gas company questioned the results of the tests made by the hired expert, and promised to purchase a calorimeter in order that the accuracy of its tests could be substantiated. It now declares the tests by the city expert were proven inaccurate and the accuracy of the company's tests substantiated, and offers to make a present of $100 to the expert employed by the city, if he can make and distribute 500 B. T. U. gas, the company having claimed from the first that had it been producing gas that low in quality it could not have distributed it.

THE compromise agreement between the city of Lincoln, Ill., and the Logan Gas Company has been filed with the State Public Utilities Commission. The compromise, which was suggested by Engineer Lilley after the gas company had submitted a reduction, calls for: $1.40 per 1,000 feet gross; $1.25 per 1,000 feet net. No bills rendered less than 35 cents.

THE residents on Lincoln place, Brooklyn, N. Y., have filed objection to the proposed substitution of electric for gas lighting for street purposes. The objection of the residents is based on the belief that the glare of the electric lights would make the street undesirable from a residential standpoint, and unsafer for automobile traffic than the softer illumination of the gas mantle lights.

A FRANCHISE for a gas plant in Iron River, Mich., to William Hayden, of Traverse City, has been presented to the city aldermen. It provides a rate of $1.75 per 1,000 feet and gives the corporation the exclusive rights to all of the public thoroughfares of Iron River for a period of 30 years. Work on the plant shall begin by August, 1916, and it must be completed in 1918.

PRESIDENT COWDERY, of Peoples Gas, Light and Coke Company says that the directors are discussing plans to furnish cheaper gas to consumers in the Chicago territory. It is unofficially said the company plans to spend $14,000,000 in building a new plant.

A RESOLUTION requesting the Henrico County (Va.) Gas Co., to charge the same gas rates as those charged in Richmond proper by the municipal works, was recently adopted by the North Richmond Citizens' Association. A similar set of resolutions have been adopted by the Citizens' Associations of Highland Park and Ginter Park, and a joint committee from these three organizations will appear before the Administrative Board, with the request that the city extend its mains at once. Citizens of the Northern suburbs of the city are now paying $1.10 per 1,000 cubic feet of gas, while in the city proper the rate is only 90 cents, and is to be cut to 80 cents shortly.

UTILITIES COMMISSION NEWS.

RATE OF RETURN PROPORTIONATE TO EFFICIENCY OF OPERATION.—The Public Utilities Commission of Idaho has handed down an order and opinion in the case of the city of Wallace, versus the Northwest Light and Water Company and the Sunset Brewing Company. The complaint was that the rates charged by the company for electricity were unjust and unreasonable. The order was written by Commissioner John W. Graham, and says:

"When the valuation of a public utility has been determined on a scientific plan for rate-making purposes, and a schedule of rates fixed in accordance with such valuation, then that valuation and the valuation for taxation purposes should be practically the same, of course. There is no justice or equity, in the practice of assessing boards, fixing excessive valuations on public utilities where the valuation for rate-making purposes has been determined. In case an excessive valuation for taxation purposes is made, the burden will eventually fall directly upon the customers of the utility."

Outlining the policy of the commission regarding rates of return, the decision says:

"The defendant claims that it should be entitled to from 10% to 12% annual return on the value of the property. Considering the hazard and risk connected with operating a utility in a community like this, the commission finds that 10% per annum is a reasonable rate of return to be allowed. It must be distinctly understood that the rate of return allowed in this case shall not be considered as the fixed rate of return for all utilities of this character. The rate of return in each case shall be determined after due consideration of the hazard and risk connected with the operation of the utility, the efficiency in operation and the economy in management; giving to that utility showing the highest efficiency in operation and the greatest economy in management and furnishing service to the consumer at the lowest possible cost, the highest rate of return. This policy will encourage the management of utilities to keep their plants up to the highest point of efficiency, to practice all economy possible in operation, and to reduce the cost of the commodity to the consumers to a minimum."

SUGGESTS DEAL THROUGH CHANCERY.—The Public Utility Commissioners of New Jersey, in denying the application of the Newton Gas and Electric Company for permission to raise the rates, recommends that the company be sold through Chancery proceedings. The board's option is that a change of ownership will result in putting the company back on a sound basis and insure satisfactory service at a reasonable rate. The Newton Gas and Electric Light Company has been in the hands of a receiver, William Keplinger, since August, 1911, and during his administration there have been numerous complaints about the quality of the service.

The receiver sought to secure approval for the rates which would raise the cost from 10% for small consumers to about 100% for large installations. If the property is sold in Chancery proceedings, there will be considerable interest in the price obtained for it. The company was capitalized for $140,000; bonds were issued for $150,000, and since it went into the receiver's hands about $45,000 of receiver's certificates have been issued. Mr. Keplinger has stated that experts say, that on a replacement basis, the plant is worth $240,000.

CONSIDER DIRECT EARNINGS ONLY.—In considering the application of the Sweetwater Water Company, for authority to increase its rates, the California Commission held that, irrespective of the fact than a plant was constructed primarily for the purpose of increasing realty values, the real estate being afterward sold at a profit, the company building the system is still entitled to a return on its reasonably useful value, and that profits made on reality cannot be considered as detracting from the value of the plant. However, such value shall not include unnecessary or long extensions which would not have been constructed except for the purpose of enhancing property values.

Financial Notes.

H. M. BYLLESBY & COMPANY are selling $500,000 6% gold notes of STANDARD GAS AND ELECTRIC COMPANY, at 91 and accrued interest to net 6.75%. These notes are part of the loan recently offered to its share holders, in which subscriptions totaled over $2,000,000. An excellent gain in gross and a marked advance in net earnings are reported by Standard's subsidiary companies for the past 12 months. The population served by the subsidaries is in excess of 1,750,000 and the operating units of Standard are now serving over 316,000 customers. The large majority of the business of these companies is in the electric and gas industries, with comparitively small amounts involved in the railway business and other minor utilities. One of Standard's largest subsidiaries is the Louisville Gas and Electric Company, where large gains have been made this year in both gas and electric branches of the business.

THE directors of the UNITED GAS AND ELECTRIC CORPORATION, on Dec. 2, declared a dividend of 3% upon the 1st preferred stock, payable Dec. 30 to stockholders of record Dec. 20. This is the first dividend paid on the company's 1st preferred stock since April 1, 1914. In response to an inquiry as to the future dividend policy of the corporation, George Bullock, the President, said: "I have every reason to believe that with a continuation of the present prosperity of the company, the payment of current dividends from now on will be resumed on our first preferred stock, as the operating results of all the subsidiaries for the past 6 months have been very gratifying, and substantial increases in both gross and net are being shown by practically all the companies.

THE UNITED GAS IMPROVEMENT COMPANY has declared a quarterly dividend of 2% ($1 per share), payable January 15, 1916, to stockholders of record at the close of business Dec. 31, 1915.

THE California Railroad Commission has authorized the WESTERN STATES GAS AND ELECTRIC COMPANY to withdraw from the Girard Trust Company, trustee, $86,947.64, to reimburse the company for plant betterments.

THE directors of the UTAH GAS AND COKE COMPANY have declared a dividend of 1¾%, payable January 1.

PRESIDENT C. H. GEIST of the NORTHERN INDIANA GAS AND ELECTRIC COMPANY, and Samuel T. Murdock, president of the INDIANA LIGHTING COMPANY, are negotiating for the consolidation of gas, electric and heating properties in a score of cities in Northern Indiana, representing an approximate value of $9,000,000. Among the cities whose utilities are involved are Fort Wayne, Logansport, Bluffton, Decatur, Frankfort, Wabash, Peru, Lebanon and Crawfordsville, Ind., and St. Mary's and Fort Recovery, O. Directors of both concerns have approved the sale, and more than 80% of the stockholders have voted in favor of the transfer. Another account says that the Insull interests and the United Gas Improvement Company of Philadelphia have been mentioned as probable buyers.

ANNOUNCEMENT has been made that the $900,000 common stock of OHIO CITIES GAS COMPANY offered to stockholders at par, has been over subscribed more than four times, the aggregate of subscriptions from 1,287 stockholders reaching $4,260,400. While President Dawes and other directors of the company and its subsidiaries subscribed for $911,800 of the new stock, they relinquished their subscription rights so that other stockholders could receive larger allotments. The common stock is now quoted between 122 and 123.

GROSS earnings of the FALL RIVER GAS WORKS CO. for October were $51,053, as against $50,340 in the same month of 1914. Net earnings were $19,047, as compared with $17,719 in 1914.

A SYNDICATE composed of Alexander Brown & Sons, of Baltimore, Aldred & Co., of New York, and Jackson & Curtis, of Boston, will underwrite the conversion of the $2,600,000 5% notes of CONSOLIDATED GAS, ELECTRIC LIGHT & POWER CO., of Baltimore, issued last March. Notes are convertible into common stock of the company at 115. The company have issued a notice calllng these notes at par and interest, and holders will have 25 days in which to convert. All who do not convert will be paid cash. The notes which mature in March, 1917, were placed at 98 and interest. The syndicate which has been formed will take over for cash all stock set aside for the conversion of the notes which is not taken by the noteholders.

THE NEW ORLEANS RAILWAY AND LIGHT COMPANY has declared its regular quarterly dividend of $1.25 a share, on its preferred and a dividend of 50 cents on its common stock. This will mean the disbursement of $225,000 among shareholders, $125,000 to the holders of its $10,000,000 preferred, and $100,000 to the $20,000,000 common stock. Returns from the various constituent traction and light companies controlled by the American Cities Company, together with the New Orleans dividend, are regarded as indications that the holding corporation will pay a dividend of $3 a share on its preferred stock. Owing to the jitney competition and general depression, the American Cities in June of this year, reduced the dividend to $1.50 a share, although the stock is cumulative and the payment of the other half is only deferred until the earnings justify its payment.

CONTENTS.

AN ASTERISK (*) DENOTES AN ILLUSTRATED ARTICLE.

*GAS LIGHT IN PHOTOGRAPHY, by Robert ff. Pierce..... 385
*TAR DEHYDRATION, by E. V. Chambers. 389
REACHING THOUSANDS OF PEOPLE BY MEANS OF THE LANTERN, by J. W. Fuller..... 391
LIQUID SAMPLING SPECIFICATIONS..... 391
EDITORIALS..... 392
Selling the Public What It Wants—The Same Reasons Apply to America—Civic Federation to Discuss Vital Questions—Development by Private Capital or by Taxation?—Empire State Gas aad Electric Association—I. E. S. Council Meeting—Annual Meeting. Society of Gas Lighting—Institute Meeting in Chicago.
LOYALTY OF CORPORATION EMPLOYEES, by R. H. Ballard. 394
NATURAL GAS LEAKAGE..... 394
*A GAS LIGHTED CATHEDRAL..... 395
DOMESTIC FUEL, by R. E. Slade..... 396
NEW METHODS AND APPLIANCES 397
*A Smoke Indicator—Protecting the Eye from Harmful Radiation by Crookes's Glasses—*Connecting Cast Iron Pipe Under Water.
ITEMS OF INTEREST FROM VARIOUS LOCALITIES..... 398
Beal Medal Award—German Coal Shortage—Invented Cheap Storage—Accident Prevention Films—For Employee's Concert—Walter Learned Dead—A Golden Wedding—To See if It will Work—Mr. Goggin and Mr. Jameson Interview the President—Mr. Conklin Goes to Daytona—Two American Public Utilities Transfers—A Generous Contribution—Look-out for the Woman's Club—Progress Club Dinner—Mr. Peck an Educator—Too Good to Kick About—Morristown Rate Reduced—Municipal Plant Still Losing—Santa Claus Cook—Mixed Gas in St. Joe—Too Poor to Use—Lincoln, Ills., Rates Set—Brooklyn Residents Prefer Gas Lighted Streets—Iron River, Mich., Franchise—President Cowdery Wants Cheaper Gas—Suburbs wants City Gas or City Rate.
UTILITIES COMMISSION NEWS..... 399
Rate of Return Proportionate to Efficiency of Operation—Suggests Deal Through Chancery—Consider Direct Earnings Only.
Financial Notes..... 400
Public Lighting Table for Dec., 1915 (Ad. Section)..... 7
Meeting Times of the Various Gas Associations (Advertising Section)..... 21